

state for very long, which increases the risk of severe cardiac damage such as a heart attack. The present invention solves this problem by enabling the clinician to steer the image planes of a 2D array probe to the different orientations for the desired views of the heart. This is done while the patient is relaxed before the stress is applied. As each view is precisely acquired the plane orientation is stored in the ultrasound system. The patient's cardiovascular system is then stressed. When the desired stress level is attained the ultrasound system is triggered to automatically replay the sequence of stored plane orientations so as to quickly acquire images in the desired image plane orientations. This can be done in a fraction of a second, rather than the many seconds or even minutes required by the manual probe repositioning procedures of the prior art. The images necessary for diagnosis are thus acquired with minimal risk to the patient, and the patient can then immediately return to a relaxed condition. The elements of Claim 1 which make this possible are "a storage device responsive to the plane orientation control and operative to store parameters of different image plane orientations selected by operation of the plane orientation control;" and "an acquisition control, coupled to the beamformer and responsive to the stored parameters, for initiation in a diagnostic exam of the acquisition of a sequence of image planes in the selected succession of different orientations with respect to the selected anatomy."

The Rafter et al. patent describes an ultrasound system which automatically changes the system presets for the different stages of a contrast stress echo exam. Instead of using the term "system presets", Rafter et al. call each set of presets a "state." See column 7 of the patent. System presets are the control settings that must be properly adjusted before doing any ultrasound exam. The basic patent on saving presets and reusing them is Kinicki et al. As each table in Rafter et al. shows, eighteen or more parameters must be adjusted for each desired image. Rafter et al. store the presets for each stage of a stress

protocol. Then, when the sonographer moves to another stage of the exam, instead of the protocol simply instructing "acquire a low MI LVO image," the system automatically invokes the presets for that image. The probe is thus immediately ready to be manipulated by the sonographer to acquire the necessary image without further resetting of the system controls.

But the probe must still be manually manipulated to acquire each new image of the anatomy being diagnosed. It is seen that none of the state parameters in Rafter et al. are for or relate to image plane orientation. That is because the anatomy of each patient is different, and in some exams the location of the anatomy of the patient changes during the exam such as is the case in fetal exams. It is for these reasons that ultrasound systems of the prior art do not store image plane orientation. There is simply no reason for doing so.

Rafter et al. do not show or describe either of the claim elements quoted above.

To the system preset patent of Rafter et al. the Examiner would add Poland. Poland describes a two dimensional array transducer with the ability to manually steer the image plane while the probe is held against the patient's body. When the target anatomy is obscured by, for example, the ribs, the Poland system enables the user to manually steer the image plane until the target anatomy is in view. This would correspond to "a plane orientation control, coupled to the beamformer controller, for adjustment of the orientations of a plurality of image planes relative to selected anatomy," the sixth claim element of Claim 1. Still absent from Poland are any ability to store a sequence of plane orientation parameters employed by the plane steering control, and any ability to acquire image planes in the sequence of stored image plane orientations, the two claim elements quoted above. Thus it is seen that the combination of these two patents fails to render Claim 1 unpatentable. Since the concepts of storing an initial sequence of manually set plane orientations, then replaying the sequence to acquire images in the sequence of

stored plane orientations runs through all of the claims of the application, it is respectfully submitted that Claims 1-20 are patentable over the Rafter et al. and Poland patents, both of which are owned by the same assignee of the present application and were cited by the applicant in this application.

How does the Examiner overcome the absence of these important claim elements? Merely by stating that "the skilled artisan would recognize that it would be useful to store plane orientation information (and likewise utilize that information to acquire data from successive plane orientations)" and that "it is within the skill of the art to contemplate storing information (and later replaying) of plane orientations." No basis is given for attributing this insight to the hypothetical skilled artisan. As previously stated, there is no reason in Rafter et al. or Poland to want to save a sequence of plane orientation settings, which is why both patents leave acquisition of the desired images in the hands of the sonographer. The cited references do not support the Examiner's "skilled artisan" speculation at all. Only the present application supports the speculation, a classic case of hindsight. It is respectfully submitted that the present claims cannot be rejected on the basis of skills of the skilled artisan for which no support is found in the cited patents. If they could, then there would be no patents as every claim can be rejected on such basis.

In view of the foregoing remarks, it is respectfully submitted that Claims 1-20 are patentable over Rafter et al. and Poland. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. §103(a) be withdrawn.

In light of the foregoing amendment and remarks, it is respectfully submitted that this application is now in condition for allowance. Favorable reconsideration is respectfully requested.

Respectfully submitted,

PATRICK RAFTER

By: /W. Brinton Yorks, Jr./  
W. Brinton Yorks, Jr.  
Reg. No. 28,923

Philips Electronics  
22100 Bothell Everett Highway  
P.O. Box 3003  
Bothell, WA 98041-3003  
(425) 487-7152  
May 1, 2009